

Ces caractères suffisent pour distinguer ces deux espèces de la nôtre indépendamment de la taille.

XII.—*On some new and little known Hot Springs in South Bihar.*—By
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In the southern portion of Bihar, amongst the hills—a Gangetic prolongation of the great Vindhaya range—forming the natural boundary between Bihar and Deltaic Bengal, are numerous hot springs, several of which have already been described in more or less detail. Others again, situated in wild and almost inaccessible localities, have merely been mentioned by name, on casual hearsay report, the exact sites and other particulars remaining undetermined, while some have altogether escaped notice. The present paper deals mainly with those falling under the last two categories.

Of the hot springs here described nine do not appear at all in Mr. Oldham's descriptive List of Indian Hot Springs, published in 1882,* which is now the *locus classicus* on this subject; but Mr. Oldham had omitted from his list one of these hot springs which had long ago been recorded by Dr. Buchanan in his Survey of Bihar.†

For brevity as well as contrast, I present the observations as far as possible in tabular form. The springs belong to two natural series, *viz.*, (a) those (Nos. 1 to 8) situated along the southern flank of the hill-range of the Santál Parganas, and (b) those (Nos. 9 to 15) situated in the Mungir (Monghyr) district among the so-called Kharagpur hills. I may state that the elevations were ascertained by hypsometrical observations, while the latitude and longitude were obtained by carefully fixing the position of the spring with reference to the surrounding villages on the large scaled (4 miles to the inch) Survey of India map.‡ The temperatures are recorded in degrees of the Fahrenheit scale. The thermometer used for the temperature of the spring-water had recently been compared with a standard thermometer. The names of the springs and adjoining villages have been spelt according to their local pronunciation.

* *Thermal Springs of India*, by the late T. Oldham, LL. D., F. R. S., &c. Edited by R. D. Oldham. Memoir Geolog. Surv. of India, Vol. XIX, pt. 2, Calcutta, 1882.

† *Eastern India*, II, 197. Most of the details regarding the Bihar hot springs quoted by Dr. Oldham as from Capt. Sherwill's Report (J. A. S. B., XXI), had already been recorded by Dr. Buchanan.

‡ The correction of $-1^{\circ}21'$ for longitude noted on the map was not taken into account.

TABLE I.

Serial No.	Name of Spring.	GEOGRAPHICAL POSITION.				GEOLOGICAL POSITION.	Height in feet above Sea.	Temperature of Spring.	Temperature of Air.	Temp. of adjoining pool or stream.	Sulphurous or not.	Worshipped or not.	Date of Observation.	Previously recorded or not.
		Thana	Police circle.	District.	Lat. of Spring.									
1	Lau-lan dah.	Sibpur	Mahesh-pur	Santal Parganas.	87 43	Lateritic hollow in trap with quartzose grit near.	46	122°	76°	79°	Slightly	Yes	2-12-89	Not
2	Barāmasta.	Birki	"	"	87 42	A trap-dyke in limestone.	33	93°	61°	62-5°	Not	"	4-12-89	Not
3	Thariya pani.	Gopikanador	Dumka	"	87 31	Function of gneiss and coal.	407	93°	69-2°	76°	Not	"	5-12-89	No elevn. given & different temp.
4	Tāt-loi.	Palasi	"	"	87 16	Gneiss with sandstone not far off.	484	148-5°	59°	58°	Slightly	"	9-12-89	No elevn. given
5	Numbil.	Kendghatta	"	"	87 13	Function of sandstone and quartzose grit.	127	119-6°	69°	72°	do.	"	11-12-89	Not visited
6	Tāpat pani.	Hetbeliya	"	"	87 19	Conglomerate outcrop.	126	102°	65°	63°	do.	"	11-12-89	do.
7	Su-sum pani.	Bāghmāra, Kumrabad	"	"	87 21	do.	122	84°	64°	61°	do.	"	12-12-89	Not

Serial No.	Name of Spring.	GEOGRAPHICAL POSITION.				GEOLOGICAL POSITION.	Height in feet above Sea.	Temperature of Spring.	Temperature of Air.	Temp. of adjoining pool or stream.	Sulphurous or not.	Worshipped or not.	Date of Observation.	Previously recorded or not.	Recorded by Buch, &c.	
		Nearest village.	Thana Police circle.	District.	Lat. of Spring of Long.										Not	Recorded
8	Bhunka.	Ranibahal	Mungr	Santal Parganas	Mungr	(No rocks visible near.)	112	82°	61°	62°		Yes	13-12-89	Not	Not	Recorded
9	Singhi Rikhatatal panti.	Singhoul	"	Mungr	Quartzite dislocation.	579	90.5°	61°			"	"	4-1-90	Not	Not	Recorded
10	Panchbhurtatal panti.	Kachua	"	"	Quartzite.	329	84.4°	63°			Not	?	4-1-90	Not	Not	Recorded
11	Tatal panti.	Bhimband	Khargapur	"	do.	314	146.1°	63°		67°	Slightly	Yes	7-1-90	Not	do.	Recorded
12	Sita Kund.	Sitalpur, Mungr	Mungr	"	do.	{ 137° 136° 137°	{ 72° 72° 68°				Doubtful	"	11-1-90	do.	do.	Recorded
13	Garm panti.	Barde	"	"	do.	...	137°	68°			do.	No	11-1-90	Not	Not	Recorded
14	Bains Pahar do.	do.	"	"	do.	...	102°	72°			Not	"	5-3-90	Not	Not	Recorded
15	Bhaduria bhurtatal panti.	Daryapur	Jamalpur	"	do.	101	98.5°	67°			Not	"	6-3-90	Doubtful	Doubtful	Recorded

TABLE I.—Continued.

Láu-láu-dáh is the Santáli name for 'hot water.' This spring is situated in a slight hollow in lateritic soil near the bank of a small stream called the *Boru nadi*, about half a mile north-west of Sibpur village in the Pákur subdivision of the Santál Parganas. No rock is visible in the immediate neighbourhood, but the surrounding country is undulating with occasional outcrops of trap and quartzose grit. The spring is very copious; I roughly measured the outflow at about 26 gallons per minute. This copious outflow in a somewhat sandy tract of soil has resulted in a small crater or basin-like depression from the centre of which the spring issues. The depression is about 3 feet deep and at its margin about 10 feet in diameter. Profuse discharge of gas bubbles forth. The gas has a slightly sulphuretted odour, it is not inflammable, and no perceptible blackening of a silver coin ensues after immersion for two minutes in the spring. A small quantity of flaky sulphurous looking* precipitate is deposited along the course of the outflowing stream. A few tufts of confervoid growth grow within the spring at a temperature of 122° F.; but these become much more profuse along the stream. The spring itself and its outflowing channel for many yards are apparently devoid of large animal life, and contain numerous macerated bodies of frogs and other small animals which have perished in attempting to cross the hot water: in front of me, a frog in the endeavour to escape leaped into the stream and was instantly killed by the hot water. The water has a slightly saline taste, with a neutral reaction. By the side of the spring are the ruins of a small temple to Síb (from which the adjoining village derives its name). An isolated pool of water only three yards above the spring has a temperature of 79° F. The spring is perennial; its water is not drunk.

Bárámasia in Hindi† signifies literally 'of 12 months,' and the spring is so called because it flows throughout the 12 months of the year. The Santals call it 'Bhumuk.' The spring appears close to an outcrop of trap in a limestone; it issues in two places about 4 feet apart, and the discharge is only about one-third of the above described spring. It has no sulphurous odour; the few gaseous bubbles discharged are not inflammable and do not support combustion; silver is not blackened on short immersion; the reaction is neutral. Small fish-fry and ordinary waterweeds and confervæ are abundant. The water is used for drinking and bathing. Mahadeva is worshipped here. The temperature of a cold spring 20 yards off is 62·5° F.

* A similar looking deposit from another hot spring was very kindly analysed by Dr. Warden, the Chemical Examiner, with the result of showing that it consisted of "free sulphur, sulphuric acid, iron and siliceous matter."

† The Hindus here, living on the border between Bihar and Bengal, speak a mixture of Hindi and Bengali.

Jhariya is a Santáli form of the colloquial Hindi *jharna* (Sanskrit *jhar*) a spring or cascade. This spring is situated at the eastern end of a marsh fed by it. It is recorded under the name of 'Jervapani' in Mr. Oldham's list, with a temperature of 87° F. I found by wading into the marsh, the temperature to be 93°, while a streamlet about 100 yards off was 76°. The outflow is copious.

Tát-löi, also called *Tát-nöi*, is a Bengali corruption of *Tapta nadi* or the hot rivulet.* This spring is well named, as its outflow is so very copious that it produces at once a large stream. It emerges about 50 yards from the left bank of the Bhúrbhúri river near the village of Palási, from numerous chinks, in the rocky gneissic bed of a small streamlet. These chinks, giving vent to the spring, extend over an area of about $20 \times 2\frac{1}{2}$ yards. In the cool winter morning the position of the spring is indicated by the dense clouds of vapour hanging over it and also along the issuing stream for several hundred yards. The water has a decidedly sulphuretted odour, but it did not perceptibly blacken a silver coin on two minutes immersion. A good deal of flaky deposit is found in the bed of the stream, and confervæ grow even at the hottest parts of the spring where the temperature is 148·5° F. Ten yards above the spring the temperature of the streamlet is 58° F. and the aerial temperature is 59°. The highest temperature recorded in July 1882 by Mr. Oldham was 145°; † while Dr. Buchanan found the temperature to be 148° F. on the 28th October *circa* 1809. ‡

Nun-bíl or the 'saline marsh' is a small marsh containing several hot springs of a sulphurous nature, and the sulphurous deposit accumulating in the marsh appears to have given rise to this name. The chief spring is found where an adjoining rivulet has cut away the soil near a border of the marsh. At the time of my visit this spring was not visible in the sandy bed of the stream; but an old resident indicated a spot where on digging to a depth of about two feet a spring feebly welling up was reached. Another hole was dug about a yard above this one, and reached a more copious spring with hotter water. This point is in the river bed 17 yards distant in a direct line, 3° east of North (magnetic), from the large *sál* tree on the river bank sacred to the goddess of the spring. At first the temperature only rose to 113° F., but on cutting a

* In colloquial Bengali the sun's heat (*tapta*) is ordinarily spoken of as *tát*, and hot rice is called *bhát tátu*. The word *nadi* in Bengali is indifferently pronounced *nödi* or *lödi*, the *n* and *l* being always interchangeable, and the short *a* acquiring in Bengali an *ö* sound; moreover the *d* is occasionally dropped from this word, *e. g.* in Baraloi and Bânsloi, the names of rivers in the adjoining districts of Birbhum and Rájsháhi.

† *Op. cit.*, p. 43.

‡ *Loc. cit.*, p. 198.

channel to allow of the free escape of the water the temperature rose in 15 minutes to 119·5° F. A considerable ebullition of slightly sulphuretted gas occurred. A silver coin on immersion for five minutes was very slightly discoloured. The rock in the neighbourhood is sandstone and quartzose grit intersected by trap.

Two more hot springs are reported to occur about half a mile further down the course of this river (here called *Nun-bíl nadi*) but the temperature is reported to be not more than that of the springs in the *bíl* which I found to be 100·5° F.

The direction of the *Nun-bíl* spring given by Sherwill from native, information, and for which he gives latitude and longitude, is most inaccurate and misleading. Dr. Buchanan on the other hand elicited its true position approximately.* It lies 9½ m. south-west of Kumrabad, near the village of Kendghata.

Tapat-páni, a colloquialism for *tapta páni* or 'hot water,' is the name of a small sulphuretted spring on the left bank of the Mor river near the village of Hetbeliya, about 1¼ miles north of Kumrabad. It issues from a sandy pool below a lateritic stratum and near an outcrop of coarse conglomerate. The outflow is only about two gallons per minute. Sulphuretted fumes are given off, and the pool and its outflowing channel contain a considerable quantity of yellowish flaky deposit, evidently sulphur. The temperature of the spring is 102° F., while that of the Mor river, about 10 yards off, is 62° F.

Susum-páni means 'tepid water' in the vernacular. This spring is situated about 3 miles S. E. of the last noted spring and close to the village of Bághmára, on the opposite bank of the Mor river, in a small marsh, which is in line with another outcrop of coarse conglomerate dipping to the N. W. The temperature of the spring is only 84° F., but it is said to have been formerly much hotter. The temperature of a small stream 15 yards off is 62° F. No sulphurous odour is perceptible, and the outflow of water is sparse.

Bhumka, apparently the same name as '*Bhumuk*' applied by the Santals to the first noted spring and apparently related to the Hindi *bhumi* earth, is situated in a small marsh on the right bank of the Mor river a quarter of a mile from Ránibáhal village. It seems an instance of a hot spring which has regressed. It has the reputation of having been hot till quite recently—the village headman of Ránibáhal who led me to the spot seemed surprised that the spring was not decidedly hot. Its deity, called '*Bhumka burhá*,' is still worshipped at the place by the Mal Paharias from the hill three miles off, who call the spring '*Choto Nun-bíl*'

* *Loc. cit.*, p. 200.

to distinguish it from 'the great' Nunbil already described. The outflow is scanty and there are no sensible sulphuretted fumes.

Singhi Rikh tatal pani, or the 'hot water (at the shrine) of Rishi Singhi,' is a copious hot spring in a gorge among the Singhoul hills. It issues in 6 or 7 places from below a high cliff of quartzite and at once forms a considerable stream which lower down is called *Dahina dah* by the Kora hillmen. No sulphuretted smell is perceptible. The water is drunk. A temple to Mahadeva and a *kund* for bathing have been erected at this highly picturesque site—which is a favourite place of pilgrimage, especially on the *Sib-ratri* festival in February.

Panch-bhur, or the 'five chinks or clefts,' is a spring which emerges in five streamlets amidst masses of quartzite rock, from a small hill about 3 miles east of the highland village of *Kachu*. The water is heard flowing for some distance underneath the decomposed quartzite. On coming to the surface it has a temperature of only 84.5° F.

The *Tatal-pani*, or 'hot water,' spring of Bhimbhand, are well characterized by Dr. Buchanan* as "by far the finest in the district." The highest temperature recorded by Dr. Buchanan *circa* 1809 was 150° F.; Sherwill in 1854 found it 147°. In January of this year the highest temperature found by me was 146.2° F. The water can be heard flowing under the masses of quartzite debris, so that the temperature a few feet further in would be doubtless higher. A very faint sulphuretted smell is perceptible and in the stream-bed is a slight deposit of light yellowish flaky material—this formed such a thin coating over the stones and confervoid growth, that I could not obtain a pure sample of it. Dr. Buchanan calls it 'siliceous tufa'—he found it did not effervesce with nitric acid. It appeared to me to be sulphurous. No blackening of a silver coin occurred after immersion for 5 minutes.

Sita-kund, or 'Sita's well' or pond, where according to the legend Sita bathed after passing through the fiery ordeal, and so imparted to the water the heat she had absorbed from the fire, is a not uncommon name for hot springs in India. This particular one near Mungir is well-known, and only figures in this list in order to exhibit my observations on its temperature, &c.

The *garm-pani*, or 'hot water,' of Barde village is practically a branch of the above-noted *Sita-kund* hot spring. It is found on the bank of a pond in the Moslem village of Barde, about 300 yards N. W. from *Sita-kund*. In January it had exactly the same temperature as *Sita-kund*, *viz.*, 137° F. Owing to its unholy situation it is not worshipped; and is only visible as a surface spring in autumn and winter; in

* *Loc. cit.*, p. 200.

March when I revisited the spot no spring was visible, and on digging down two feet the temperature of the water found only registered 103° F.

Báinsa pahár hot spring is also to be regarded as an offshoot from Síta-kund, from which it is distant about one-third of a mile in a southeasterly direction. These three last springs lie almost in a straight line—Síta-kund being in the middle. This spring emerges from a fissure in quartzite rock at the base of the small hill of Báinsa which also consists of similar rock. At my visit in March it was a sluggish spring in a puddle polluted both by men and cattle. No sulphuretted smell was perceptible. The water is only drunk by cattle.

Bhaduria bhúr, or the 'cleft of Bhaduria' hill, is a hot spring which is locally believed to be a branch of Rishi-kund hot spring about two miles further E. S. E. on the other side of the range of hills. The spring, which is much cooler than Rishi-kund, emerges at the foot of Bhaduria hill from amongst masses of quartzite rock accompanied by a free discharge of gaseous bubbles, devoid of smell and unflammable. The water is drunk by men and cattle. Much confervoid growth is present. This seems to be the spring described by Buchanan* as "about five or six miles south from Síta-kunda, at the western foot of the ridge running south from Mungger and at a place called Bhurka." The spring, however, is over seven miles from Síta-kund, and its temperature at my visit was 98·5° F., compared with the temperature of 112° given by Buchanan.

The names of these hot springs, it will be seen, are all trivial, usually meaning simply 'hot water.'

The *Chemical Composition* of the water and of the gaseous contents of the springs could not be very fully ascertained, owing to the great difficulty of properly collecting and carrying off from such remote places a sufficient quantity of material for analysis. In only four instances was I able to collect and safely transport suitable samples of the water, which Dr. Warden, the Chemical Examiner, has very kindly analysed with the results shown in the accompanying table:—

* *Loc. cit.*, p. 197.

TABLE II.

		RESULTS OF ANALYSIS EXPRESSED IN PARTS PER 100,000.												
Serial No.	Name of Spring.	Total solid matter.	Chlorine.	Free Ammonia.	Albuminoid Ammonia.	Nitrogen as Nitrates and Nitrites.	HARDNESS IN CLARK'S SCALE.			Nitrates.	Nitrites.	Behaviour of solid residue on ignition.	Sulphites.	Iron.
							Total.	Temporary.	Permanent.					
1	SibpurLáu-láu-dah	32·72	5·3	·008	·004	·034	1·0	...	1·0	Trace	<i>Nil</i>	Pre-sent.	?	
2	Báramasia.	36·4	1·6	·02	·0048	·029	21·0	12·5	8·5	Trace	<i>Nil</i>	do.	?	
11	Sita-kund.	19·46	2·46	·0024	·004	·12	9·0	5·5	3·5	Trace	<i>Nil</i>	Trace	Trace	
15	Bhaduria-bhur.	13·6	0·52	·0032	·0032	·06	7·0	5·0	2·0	Pre-sent.	Pre-sent.	Pre-sent.	<i>Nil</i>	

Of the mineral matter of No. 1 sample a considerable proportion seems likely to be chloride of sodium, owing to the large proportion of chlorine and the very slight hardness of this water. In No. 2 sample, the extreme degree of hardness is accounted for by its traversing a lime formation—it seems to contain an excess of carbonate and also of sulphate of lime. The Sita-kund water appears to contain chloride of calcium and perhaps sodium. The absence of blackening of the solid residue on ignition indicated the absence of organic matter from all of the samples. All contained sulphur in the form of sulphates.

The gas evolved at the springs has when sensibly odorous or otherwise been noted in column 13 of Table I—very slight traces of sulphuretted hydrogen are detectable by smell. Nitrogen is a gas which is evolved from hot springs in much greater quantity and more frequently than sulphuretted hydrogen,* but samples of the gas evolved could not be collected for analysis: one characteristic of nitrogen is that it does not support combustion; and in every case the bubbles of gas from the springs extinguished a light, but the bursting of the bubble on the surface would of itself tend to blow out the light. Carbonic acid is occasionally evolved from hot springs—in the last two samples it could not be present in any quantity, judging from the absence of pungency in the taste of these waters: no direct test by lime or otherwise was resorted to: in every case the waters were neutral to test-paper.

* Daubeny on *Volcanos*, p. 558.

In many of the springs the gaseous discharge was so great as to agitate and spurt about the water as if it were boiling.

Very few of the European hot springs are in much repute for therapeutic purposes, few of them coming under the class of mineral springs. Those which are of value are efficacious mainly as baths, on account of the amount of sulphuretted hydrogen with which they are impregnated; and none of the springs here described contain this gas in large amount. Most of the above hot springs, however, are held in considerable repute by the natives in the neighbourhood as potent remedies, especially for itch, ulcers and other skin affections. But a most essential part of the process of cure consists in the preliminary worship which must be paid to the presiding deity of the spring.

Nearly all of these springs, as may be seen from column 14 of Table I, are worshipped by the Hindu and semi-aboriginal villagers in the vicinity; for these strange outbursts of heated water, boiling up cauldron-like and wreathed in clouds of vapour are regarded by them as supernatural phenomena, and the especial expression of the presence of a deity. The deity usually worshipped at the springs by the semi-aborigines is *Mátá* or *Mái*, the 'mother' goddess—one of the forms of *Káli*—and large melas are held in her honour. She is especially worshipped by those suffering from itch and other skin diseases; also by the barren, both male and female, who all bathe in the water and drink some of it. Goats &c. are sacrificed to her, and the rocks are daubed with vermilion or red-lead and pieces of coloured rags are tied to the nearest bush or tree in her worship. At *Tât-löi* the mela is held in January and is attended by over 100,000 persons. At *Nun-bil* the goddess is called *Nun-bil devi* and she is believed to especially reside in a large *sál* tree over the spring; her mela is held in December and also is attended by about a lakh (100,000) of persons. The melas at the other springs are less numerously attended. At *Jhariya*, the *Bhuinya ghát-wáls* (of Dravidian type, with short frizzly hair) worship with fowl sacrifice and offerings of rice, the spirit of *Son-mon Páñde*, a *bráhma*n priest who is said to have died there. The more Hinduized worshippers, however, believe that their favourite god *Mahadeva* is specially present at all those hot springs, and to him they there offer worship, except at *Síta-kund* where worship of *Rám* and *Síta* is performed.

Curiously enough, the thermal springs of relatively low temperature, which might perhaps be termed 'warm' rather than *hot* springs, are believed by the villagers to be hotter in the very early morning and to become cooler as the day advances—this opinion is evidently founded on the loose subjective sensation of the villagers, who in the cool of the morning remark that the spring, being hotter than the atmosphere,

gives a sensation of decided heat ; which contrast becomes less marked during the day when the sun has heated up the earth and air, causing these to approach the temperature of the spring.

The temperature of some of the springs, however, does seem occasionally to undergo actual fluctuation according to season and other conditions not yet well ascertained. This indeed might to a certain extent be expected, seeing that hot springs derive their heat more or less directly from volcanic action—which is essentially subject to alternate periods of activity and relative rest. A notable instance of this fluctuation is cited by Dr. Buchanan in his report on the Sita-kund “spring. He writes: “I visited this spring first on the 7th April, a little after sunrise. The thermometer in the open air stood at 68° F. “and in the hottest part of the reservoir where many air-bubbles rose, “it stood at 130°. The priests said, that about eight days before it had “become cooler, and that the heat would gradually diminish till the “commencement of the rainy season. I visited the spring again on the “20th of April at sunset, the air having been hot all day and parching ; “the thermometer in the air stood at 84°, in the well it rose to 122°. “On the 28th April I visited it again a little after sunset, the wind “blowing strong from the east, but not parching. The temperature in “the air was at 90°; in the well it only rose to 92°. The water still “continued clear ; but soon after, owing to the reduction of the heat, “and the natives being in consequence able to bathe in the well, the “water became so dirty as to be no longer drinkable by an European. “Indisposition for some time prevented me from being able to revisit “the place ; but in the beginning of July, on the commencement of the “rainy season the water, in consequence of the return of the heat, “became again limpid ; and on the 26th of that month a native sent “with the thermometer found at sunset that it stood in the air at “90°, and in the water at 132°. In the evening of the 21st September, “the thermometer stood in the air at 88°, in the cistern at 138°, and the “number of air bubbles had very evidently increased.”* That record was made about eighty years ago. I find on enquiry from the priests at Sita-kund that the water still becomes slightly cooler in early summer, but since forty years ago it has never become so cool as to permit of bathing, and they endeavour to make a miracle of this by saying that the annual cooling of the pool ceased immediately after the visit of a certain Maharatta rájá. In January of this year I found the highest temperature to be 137° F., and two months later at the same site the temperature registered 136°. When Sir Joseph Hooker visited the place on April

* *Loc. cit.*, p. 197.

1st, 1848, he found the temperature to be only 104° F.* These remarkable fluctuations in the temperature of Síta-kund are well deserving of further inquiry, and Síta-kund is so accessible to residents at Mungir that frequent thermometric observations could readily be carried out there. Several irregular observations by Mr. Masters on the hot springs of the Nám̄ba forest in Assam† also indicated considerable fluctuations in the temperature of those springs at different seasons.

The springs above described, together with some others already published, form two well-marked chains running parallel to one another in a direction from S. W. to N. E.—the one series being found along the southern flank of the Santal Pargana Hills, and the other about 95 miles further north, in the Kharagpur Hills and chiefly along their southern flank. It is interesting to find historic testimony to the former existence in this latter region of an active volcano: the Chinese pilgrim, Hiuen Tsiang who visited the neighbourhood of Mungir about “the year 634 A. D. records‡ that “by the side of the capital and bordering on the Ganges river is the I-lan-no mountain, from which is “belched forth masses of smoke and vapour which obscure the light of “the sun and moon.”

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XIII.—*Natural History Notes from H. M.'s Indian Marine Survey Steamer "Investigator," Commander R. F. HOSKYN, R. N., Commanding—No. 16. The non-indigenous species of the Andaman Flora.—By D. PRAIN.*

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The non-indigenous element in a flora—the weeds of cultivation and the cultivated plants—species introduced, involuntarily or intentionally, by man—is not often dealt with apart, since weeds are rarely in themselves interesting, and because a local treatment is hardly satisfactory where cultivated forms are concerned. But the intrusion of this element is a subject of peculiar interest, particularly when it is possible to review it historically, and as opportunities for doing this are rare, it is well to make use of all that occur.

The Indian convict settlement of Port Blair in the Andaman islands affords such an opportunity. This settlement was commenced

\* *Himalayan Journals*, I, p. 89.

† Reported by Dr. Prain in the Society's *Proceedings* for 1887, p. 201.

‡ *Si-yu-ki*, translation from the Chinese of Hiuen Tsiang by S. Beal, II, p. 187.